

CLAIMS

1. A surface acoustic wave filter comprising:

a longitudinally-coupled double-mode resonator filter in which a plurality of inter-digital transducers for exciting and receiving a surface acoustic wave are arranged adjacent to each other in a direction of propagation of the surface acoustic wave; and

a resonator having one or a plurality of inter-digital transducers for exciting and receiving a surface acoustic wave, the resonator being connected to said longitudinally-coupled double-mode resonator filter in series,

wherein a cutoff frequency on a high-frequency side of a pass band of said longitudinally-coupled double-mode resonator filter and an antiresonant frequency of said resonator are substantially equal.

2. The surface acoustic wave filter according to Claim 1, wherein two reflectors for reflecting the surface acoustic wave are provided on both sides of the plurality of inter-digital transducers arranged in said longitudinally-coupled double-mode resonator filter, in the propagation direction, so as to enclose vibration energy of the surface acoustic wave between said two reflectors.

3. The surface acoustic wave filter according to Claim 1, wherein said resonator is a one-port resonator.

4. The surface acoustic wave filter according to Claim 1, wherein two reflectors for reflecting the surface acoustic wave are provided on both sides of said resonator, in the direction of propagation of the surface acoustic wave.

5. The surface acoustic wave filter according to Claim 1, wherein said longitudinally-coupled double-mode resonator filter and said resonator are mounted on a single piezoelectric substrate.

6. The surface acoustic wave filter according to Claim 1, wherein said longitudinally-coupled double-mode resonator filter is provided with three inter-digital transducers.

7. A surface acoustic wave filter comprising:
a longitudinally-coupled double-mode resonator filter in which a plurality of inter-digital transducers for exciting and receiving a surface acoustic wave are arranged adjacent to each other in a direction of propagation of the surface acoustic wave; and
a resonator having one or a plurality of inter-digital transducers for exciting and receiving a surface acoustic wave, the resonator being connected to said longitudinally-coupled double-mode resonator filter in series,

wherein a pitch of electrode fingers in the inter-digital transducers of the resonator is larger than a pitch of electrode

fingers in the inter-digital transducers of the longitudinally-coupled double-mode resonator filter.

8. The surface acoustic wave filter according to Claim 7, wherein two reflectors for reflecting the surface acoustic wave are provided on both sides of the plurality of inter-digital transducers arranged in said longitudinally-coupled double-mode resonator filter, in the propagation direction, so as to enclose vibration energy of the surface acoustic wave between said two reflectors.

9. The surface acoustic wave filter according to Claim 7, wherein said resonator is a one-port resonator.

10. The surface acoustic wave filter according to Claim 7, wherein two reflectors for reflecting the surface acoustic wave are provided on both sides of said resonator, in the direction of propagation of the surface acoustic wave.

11. The surface acoustic wave filter according to Claim 7, wherein said longitudinally-coupled double-mode resonator filter and said resonator are mounted on a single piezoelectric substrate.

12. The surface acoustic wave filter according to Claim 7, wherein said longitudinally-coupled double-mode resonator filter is provided with three inter-digital transducers.